Response to comments from Sherry Boldt
BP America Inc.
Received by letter, March 28,2005

General Comments

1. *This document has been in preparation by the department and the stakeholder group for several years now. The department has done a commendable job finalizing the document on behalf of the agency and the stakeholders over the last year or so. However, due to the size of the document and the technical nature of the initiative, the requested review timeframe of six weeks is not enough time to thoroughly review the document and provide meaningful comments regarding its implementation. BP recognizes that additional review time will be afforded following the document's publishing in the state register as draft guidance/regulation. BP feels that additional time should be afforded the agency and the stakeholder group to meet and discuss implementation issues on which we are not currently in agreement.*

Response: To expedite the development of the guidance, the department will move forward with comments that we have received to date, and these will be discussed at the April 28 meeting. We hope to participate in a continuing dialogue with stakeholders and there will be further opportunities to comment and discuss parts of the guidance as they are developed or rewritten.

2. *Throughout the stakeholder process, the MDNR reserved the right to amend/update the document should new science become available that necessitated the same. BP also believes that the stakeholder group should be afforded the same rights and believes that a clearly articulated statement to this effect would be beneficial for all parties working with the document on a going forward basis.*

Response: The department will update the technical guidance as the science evolves and improves. Because the process of this Technical Guidance will be promulgated as rules, the department will continue to work with the MRBCA Rules Subgroup to incorporate language to this effect into the rules.

3. *In numerous areas throughout the document and its attachments, various values and process sections are missing. Most notably missing are page 9 of 9 in all of the tables in Appendix B and the gasoline-related chemicals of concern. BP feels that the document should be completed in its entirety, for ease of review, and the stakeholders afforded ample opportunity to review the document in a completed form. Review of the document in a partially completed form causes uncertainty and confusion that could prevent the most successful implementation possible.*

Response: All of the chemicals of concern that are related to petroleum products and in the Missouri Risk-Based Corrective Action Process for Petroleum Storage Tanks (Tanks MRBCA) are being addressed under a separate process by the Tanks Section. All information related to these chemicals in terms of chemical properties, toxicity values, and risk-based target levels is posted on the Tanks website and currently undergoing a review and comment process. These numerical values will be the same in both guidances.

4. *In numerous areas throughout the document and its attachments, various references to the Geologist Registration Act appear. However, all of the references are not consistent. Some references detail that a PG must conduct the field work herself/himself; while others details that the work may be performed under the supervision of a RG or PE. BP believes that if all of the work is conducted under the supervision of a RG/PE, the intent of the Geologist Registration Act has been met. BP requests that all references to the Geologist Registration Act be amended accordingly.*

Response: The guidance language will be revised to state that this type of work can be performed by or under the supervision of a Registered Geologist or PE trained in geology.

5. *Throughout the stakeholder discussions, the stakeholders held firm to the belief that the determination of a likely future use scenario would be based upon the phrase "reasonably anticipated future use". This wording has specific meaning in federal regulation, and the stakeholders desired to have this same meaning emplaced in this state guidance document. Management of future land use through a variety of Activity and Use Limitations can still be recognized and accomplished in the document and in perpetuity with the previously agreed to term. Modification of the previously agreed to term to future use could create an obligation on the part of the remediating entity to consider every potential future use even if that use is not reasonably anticipated. Application of AULs and LTS requirements to sites that meet a non-residential standard and whose reasonably*

anticipated future use is non residential is overly burdensome. BP requests that the previously agreed to term be returned throughout the document.

Response: Several members of the Workgroup have requested that the Institutional Controls Subgroup be reconvened to more completely address issues related to institutional controls and long-term stewardship. The Subgroup has agreed to re-convene and plans to do so later this month. This issue will be discussed in the next meeting of the Institutional Controls Subgroup and is also on the list of topics to be discussed by the Workgroup on April 28, 2005.

6. *The inclusion of a Default Target Level in the process creates unnecessary complication and complexity without adding a proportionate amount or degree of value. Inclusion of a DTL level makes the process appear to be a four tier process and creates obligations at the Tier I level, among other things to develop an exposure model. Tier I should be a simple comparison of site contaminant concentrations to conservative risk based screening levels on an exposure pathway specific basis. The RBSLs should be established to be protective of human health and the environment any where in the state. If site contaminant concentrations are below the Tier 1 RBSLs, the site should be granted a "No Further Action" classification without additional effort. BP requests that the MDNR give consideration to eliminating the DTL applied throughout the regulation.*

Response: We agree that, in effect, the initial characterization and comparison to the DTLs before proceeding to a Tier 1 can be viewed as a four-tier process. Please refer to page 2-3 of the June, 2003, draft Process Document, which was agreed to by the Workgroup, that discusses the Initial Site Characterization and Comparison to DTLs before making a decision on proceeding to the Tier 1 stage.

This comparison is a screening level comparison similar to the initial CALM target numbers, and it provides a simple decision tree before moving to a site conceptual model

However, it appears from this and other comments received from you and the Workgroup that the existence of three Default Target Levels, corresponding to soil type, is confusing. Although our intent was to provide additional information and make the guidance simpler, it apparently did not work out that way. Therefore, we are proposing to remove Tables B-1, B-2 and B-3 from Appendix B. The determination of soil type could then be a Tier 1 activity and added to Table 2-1 as such.

7. *Review of the Tanks Section RBCA guidance document and the MRBCA overarching guidance document revealed a number of inconsistencies. A few of these inconsistencies are the definition of the site and delineation criteria associated with petroleum related contaminants of concern. Regardless of in which regulatory program a responsible party is working, the definitions of an impacted site should be the same (i.e. the site should be based on either real estate property boundaries or area of impact) and the degree to which that impact needs to be assessed should be the same (i.e. impact delineation criteria should be based upon the specific soil type encountered and the specific land use of which the impact exists). BP requests that MDNR eliminate these inconsistencies between documents.*

Response: The Department's intent is to make these two guidances as consistent as is feasible given that conditions on Tanks-related sites may differ from those on Voluntary Cleanup, RCRA or CERCLA sites. These two inconsistencies will be placed the punchlist of discussion items for April 28.

8. *In numerous areas throughout the document, the MDNR makes reference to comparisons to both the DTLs and the Water Quality Standards (WQS). Water Quality Standards should only apply and be considered when the groundwater to surface water exposure pathway is actually complete or potentially complete. Please remove the references to the WQS in all areas of the document unless the surface water pathway is a complete pathway and consequently a direction consideration.*

Response: We agree that water quality standards are relevant where the groundwater to surface water exposure pathway is complete. However, the water quality standards are also directly applicable to groundwater itself, regardless of any connection to surface water. See 10 CSR 20-7.031 (5). The resolution of the groundwater direct use pathway describes how the water quality standards apply to groundwater in complete or potentially complete drinking water use scenarios, and how they do not in the absence of that pathway.

9. *BP requests that the MDNR agree to a meeting with stakeholders, between the March 28, 2005 preliminary comment deadline and the April 29, 2005 comment response deadline, to mutually create the punch list of remaining issues to address and to build consensus as to how the comments will be reviewed and addressed to the satisfaction of both the agency and the stakeholder group. The process used throughout this guidance development since the Hazardous Waste*

Management Commission directive has largely been a consensus building process. BP feels that this consensus building process used heretofore should be maintained throughout the final guidance document and regulation implementation.

Response: We have set a meeting date of April 28. We have identified a draft list of discussion items; additional items can be added to this list as needed.

2.1 Long Term Stewardship Requirements
"…and any LTS activities needed to guarantee that, for as long as residual contamination on site remains above unrestricted use levels, there will be knowledge of and adherence to the assumptions included in the risk calculations."

If a site has been remediated to non residential standards, through either active remedial action or natural attenuation and residential usage in not a reasonably anticipated future use, the site should not be required to implement any AULs or be subject to any LTS monitoring activities. Notice of the contaminant concentrations and the location of the impact recorded to the deed in the public sector, will enable an understanding by any subsequent developer, wishing to develop the site for a previously unanticipated future use, of the site conditions to a great enough degree that appropriate action will be undertaken. Creating a requirement to implement AULs and LTS monitoring obligations on a project site whose contaminant concentrations are above residential standards when the reasonably anticipated future use does not include residential usage is overly burdensome and will impede brown field redevelopment.

Response: This comment will be discussed in the Institutional Controls Subgroup, as mentioned in a previous response.

2.2.3 Letters of Completion
"If the maximum soil and groundwater concentrations do not exceed the DTLs and if the site poses no ecological risk, the remediating party may petition the department for a Letter of Completion."

Assuming that the initial site characterization report provides a NFA recommendation and the site characteristics support such a recommendation, the remediating party should not have to petition the department for a letter of completion. The department should issue the letter of completion upon concurrence with the consultant's or remediating party's recommendation.

Response: We agree that a separate "petition" is not necessary. We are changing this statement to read, "If the maximum soil and groundwater concentrations do not exceed the DTLs and if the site poses no ecological risk,

the remediating party should state such in its cover letter on its Initial Characterization Report that it provides to the department, and can request at that time to receive a Letter of Completion."

4.3.2 Actions to Prevent Further Deterioration
"As soon as possible, remove any light, non-aqueous phase product floating on groundwater or surface water or that has collected in excavations, and"

To be consistent with federal regulations, the phrase "and to the maximum extent practicable" should be added to the original phrase after "As soon as possible". Free product removal beyond with is practicable is a waste of resources and effort.

Response: This phrase will be added as you suggest.

5.1 MRBCA Objective of the Initial Site Characterization
"Which of the above four alternatives is selected will depend on a variety of site-specific and economic factors."

All of the bulleted items in the previous paragraph to which this sentence refers are not alternatives. The previous paragraph and section title describe them as objectives. Only one decision to which any alternatives apply can be gleaned from the bulleted items and is likely the following. Does the remediation party cleanup to DTLs/WQSs or proceed to a tiered risk assessment? It appears to BP that the first two may be objectives of the initial site characterization and the last two involve the remediating party's decision to the above-referenced question. BP suggests the paragraph's wording be modified.

Response: We have revised the wording to read:

"With respect to the MRBCA process, the objective of an initial site characterization is to collect sufficient data to determine whether:

- An ecological risk exists,
- The site qualifies for a Letter of Completion,
- The preferred remediation alternative will be to default target levels (DTLs) and/or applicable water quality criteria, or
- The site will move to a Tier 1, Tier 2, or Tier 3 assessment.

A brief description of the initial site characterization process is presented below."

5.3 Collection of Data
"The work plan must meet the minimum Data Quality Assurance/Quality Control requirements of the department's Quality Management Plan (See Appendix K for more details.)"

After review of Appendix K, it became clear that the minimum requirements in the department's QMP are very similar to the RCRA/CERCLA quality assurance project plan (QAPP) or data quality objective (DQO) process. This level of detail is more than most sites participating in the program outside of the RCRA and CERCLA programs need or should be required to perform. BP suggests minimizing the use of the QAPP/DQO process on sites where it is not needed.

"This happens because the concentration of chemicals that can be positively detected in the environmental media (soil, groundwater, sediments, and air) are limited by the capabilities of the analytical method used. "

This statement is not completely accurate. Increased method detection limits normally occur within analytical laboratory reports due to a detection of an analyte of interest out of the initial or continuing calibration range of the instrument (GC or GC/MS) being used. This detail can easily be corrected with the laboratory. If the laboratory is required to report the most method compliant analytical results regardless of the number of extractions or dilutions it takes to achieve that end point, the issue is addressed satisfactorily. (e.g. a non detect MW – 1 benzene result can be reported without dilution from the first run since it was within calibration range of 0 – 2000 ppm and a 8,000 ppm MW – 1 xylene hit can be reported with a five fold dilution within the new 0 – 10,000 ppm calibration range.) BP suggests the department consider revisions to address this issue.

"For information purposes, the following have been identified in Appendix B:

- *COCs with DTLs or Tier 1 RBTLs lower than the detection limit or Practical Quantitation Limit (PQL) of the current analytical methods and*
- *COCs that do not have a standard method listed in SW-846"*

The chemicals of concern to which these statements apply should be identified for the stakeholder group so that the stakeholder group and the MDNR may come to resolution within the consensus building approach. BP requests that the chemicals of concern to which these statements apply be identified.

Response: The integrity of any data collection and analysis is essential to accurately assessing and managing risk, which is essential to meeting a balanced goal of facilitating development of contaminated sites and protecting human health, welfare, and the environment.

Good data collection and analysis is a common goal of the department, remediating parties, and private consulting firms and laboratories. We believe that it is in the best interest of those private sector interests who perform good

data quality management for the department to ensure that all private sector entities adhere to certain standards.

However, data quality management should not become a task that is unduly burdensome. To alleviate any unnecessary "paperwork" requirements of this task, the department is considering the use of checklists and standardized models of Data Quality Management Plans that could be adopted for specific site conditions. At the April 28 meeting, we plan to open discussion on this problem to identify mutually satisfactory solutions.

6.12.1 Logging of Soil and Groundwater Monitoring Well Boreholes
"A qualified professional - a Registered Geologist (R.G.) or Professional Engineer (P.E.) registered in Missouri - must log each soil boring to indicate depths correlating with changes in lithology (with lithologic descriptions), occurrence of groundwater, total depth, visual and olfactory observations, and other pertinent data such as a soil vapor screening reading."

Does this mean that a RG or PE must be at the drill rig, or can a junior geologist/engineer log the hole and provides notes to the overseeing RG and PE for them to finalize the log? It may be impractical to have an RG or PE log every hole at a site.

Response: As noted earlier, this work can be completed by or under the supervision of an RG and PE, and the guidance will be changed accordingly.

8.7 Step 6: If Necessary, Calculate Cumulative Site-wide Risk and Compare With Acceptable Risk
"Non-carcinogenic Risk

- *The hazard index for each chemical, which is the sum of hazard quotients for all complete exposure pathways for each chemical (the total risk), must not exceed 1.0.*
- *The site-wide hazard index, which is the sum of hazard quotients for all chemicals and all complete exposure pathways, must not exceed 1.0"*

Non-carcinogenic risk is not afforded an order of magnitude relief between total risk and cumulative risk as is carcinogenic risk. BP requests that the MDNR give some consideration to relief of non-carcinogenic target risk through the site-wide hazard index.

Response: The following information is taken from the Risk Additivity and Target Levels Subgroup, Page 5-6 of 12, attached to the June draft Process Document:

> A target risk of 1.0E-5 for individual carcinogenic COCs and Hazard Quotient (HQ) of 1.0 is recommended at all levels for contaminated

soil….In addition, cumulative carcinogenic risk of 1.0E-4 must not be exceeded at any level for contaminated soil. In addressing cumulative noncarcinogenic risk, a Hazard Index (HI) greater than 1.0 could be addressed by simply taking actions to lower that risk to an acceptable level. However, that is only one option. In the presence of multiple contaminants, the subgroup recommends retaining the option to allow the HI to be broken out by target organ(s). If it can be demonstrated that the HI $\leq$ 1.0, for each target organ then further evaluation will not typically be warranted. If the HI $\geq$ 1.0 for the target organ(s), then further evaluation and/or remediation will likely be required to address noncarcinogenic risk.

The Workgroup agreed to a Hazard Quotient of 1. The department has already agreed to relief in two ways:

1. The Hazard Quotient is the sum of the Hazard Indices. In order to account for additivity of risk, the state of Massachusetts uses a Hazard Index of 0.2 at the DTL level. Missouri MRBCA uses a Hazard Index of 1.
2. MRBCA allows for assessment of risk by target organ. (See pages 9-8 and 10-4 of the draft guidance for an explanation of this process.)

This item will be placed on the April 28 agenda.

11.3.2 Ordinances and Supporting Memoranda of Agreement

"5. A commitment by the unit of local government to maintain a list of all sites within the geographical unit of local government that have received Letters of Completion under the MRBCA process."

Previously in this section, the MDNR has referenced the potential use of a UECA. If that is the case, the agency would assumedly be maintaining the UECA database. Establishing a requirement to have the local unit of government also maintain a database is duplicative and will diminish the degree to which a community or legal entity will actively participate in the process. If the nature and extent of contamination and the activity and use limitations are documented with the real estate records by the county recorded of deeds and notification is made to potentially affected adjacent property owners and utility companies, all parties who have the potential to affect the property's usage have been duly informed. The likelihood that an AUL would be violated is minimal. BP requests that MDNR reconsider its requirements on AUL duplicity, consider the LTS options currently available within the private sector, and acknowledge its own responsibilities in regards to LTS.

"Sites on the latter list may be candidates for listing on the existing State Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites"

Any intention to have sites wherein AULs are invoked listed on the above-referenced database will minimize the value which the guidance document bring to the state, minimize real estate development of brownfields, and cause contaminated properties to remain vacant. BP requests that MDNR reconsider its position in this regard.

Response: This issue will be discussed in the Institutional Controls Subgroup meeting in April.

Appendix B, Table B-1, Lowest Default Target Levels
Page B-4: " Values associated with chemicals that are common to both the departmental and tanks MRBCA (such as benzene) are being posted separately. However, when final, this information will be included in this guidance."*

Many chemical's default target levels (DTLs) are not included in the MRBCA guidance, include benzene, ethylbenzene, toluene, xylenes, methyl tertiary butyl ether (MTBE), benzo(a)pyrene and similar polyaromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), and lead. Based on the caveat printed on page B-4, their DTLs will not be posted until the guidance is final, which does not allow any review and comment on the levels and their source. With the importance of those chemicals on final remedy selection and cleanup goals at many sites, it is important to have a review of all DTLs before they are promulgated as final.

Response: As noted in an earlier response, all of the chemicals of concern that are related to petroleum products and in the Tanks MRBCA are being addressed under a separate process by the Tanks Section. All information related to these chemicals in terms of chemical properties, toxicity values, and risk-based target levels is posted on the Tanks website and currently undergoing a review and comment process. These numerical values will be the same in both guidances.

Appendix B, Tables B-2 through B-16
Same comment as above. No screening levels are presented for chemicals listed above.

Response: Please see previous response.

Appendix B, Tables B-2 through B-14 and B-16
There is no back-up or definition of what constitutes Sandy (Soil Type 1) versus Silty (Soil Type 2) versus Clayey (Soil Type 3) soil types. Overall,

please provide references on defining soil types and in the calculation of the DTLs, Tier 1 screening levels, and saturation soil concentrations. The notes state that Soil type 1 (sandy) includes sand, loamy sand, and sandy loam, Soil type 2 (silty) includes clay loam, silt, loam, silty clay loam, sandy clay loam, and silt loam, Soil type 3 (clayey) includes clay, silty clay, and sandy clay. Does that mean as defined under the United States Department of Agriculture (USDA) Triangular Classification system? There are several classification systems commonly used for characterization, including American Association of State Highway and Transportation Officials (AASHTO) and Unified Soil Classification System which each have slightly different definitions of sand, silt and clay soils.

Furthermore, many of the DTLs and screening levels for each of the three soils types are either the same (e.g., manganese and vanadium on Table B-14) or very similar (e.g., chlorobenzene and styrene on Table B-14). In addition, some chemicals have higher screening level concentrations with sandy soils versus silt and clay, while others the opposite is true. For example, on Table B-14 - Tier 1 Soil Concentrations Protective of Domestic Use of Groundwater Pathway, chemicals n-Hexane and Isopropylbenzene show a decreasing trend in concentrations with soil type, while 4-Isopropyltoluene and Methyl Ethyl Ketone show an increasing trend with soil type. All are similar volatile hydrocarbons and noncarcinogenic compounds, so they should show similar trends of screening levels with changes in soil type. Please provide backup or examples of the calculations.

Response: As with the petroleum-related chemicals, the definition of soil types has been developed in the Tanks Section and undergone its separate review. This document is currently being reviewed for inclusion in the Departmental MRBCA and will be included as an Appendix when final.

Appendix C, Section C.2 CALCULATION OF REPRESENTATIVE CONCENTRATIONS - C.2.1 Surficial Soil (0-3 feet below ground surface)
Please provide a reference for defining "surface soil" as 0 to 3 feet below the ground surface. Accidental ingestion of soil, outdoor inhalation of vapors and particulates from surficial soil emissions, and dermal contact with surficial soil do not typical occur with soils down to a depth of 3 feet below the ground surface.

Response: This definition is a product of Workgroup discussions and is found on page 3-5 of the June, 2003 Draft Process Document. Surface soil can be defined differently in Tier 3.

Appendix C, Section C.2.4.2 Representative Groundwater Concentration for Protection of Indoor Inhalation

"Groundwater concentrations protective of indoor inhalation are typically estimated using a model such as the Johnson and Ettinger (2001) model. This model assumes no lateral or transverse spreading of the vapors as they migrate upward from the water table through the capillary fringe and the vadose zone and into the enclosed space. Thus, representative concentrations for this pathway should be based on groundwater concentrations measured within the footprint of the building or up to 20 feet from the building."

Please note that the Johnson and Ettinger model assumes a steady state groundwater concentration over the exposure duration (typically 30 years for a resident, 25 years for an industrial worker). This is conservative and does not take into account finite sources and natural attenuation.

Response: Thank you. We agree that this is conservative and does not take into account finite sources and natural attenuation. The department has agreed to the use of monitored natural attenuation as part of the remedies. As agreed to earlier, the department will remain open to new scientific findings on this issue.

Table C-1, Calculation of Representative Concentrations, Surface Soil (0 to 3 feet)

Route of Exposure	Calculation of Representative Concentration
Surficial Soil (0 to 3 feet bgs)	
Soil concentration protective of leaching to groundwater or surface water body	Average of surface soil concentrations collected within the area of release.
Direct contact with soil including ingestion of soil, dermal contact with soil, and the outdoor inhalation of vapors and particulates emitted by surficial soils	Average of the surface soil concentrations within exposure domain for non-residential receptor. Maximum concentration for child receptor.

This differs from USEPA Risk Assessment Guidance for Superfund (RAGS) which states that the upper confidence limit (UCL) of the surface soil data should be used for risk assessment of adult and children receptors.

Response: We agree that this differs from the USEPA RAGS guidance. We have not received complete comments from the USEPA on the Missouri Guidance. We plan to look at this comment in concert with the USEPA comments when received.

Appendix E.9 TARGET LEVELS FOR PROTECTION OF SURFACE WATER BODIES

Step 1:
"Determine stream classification: As per 10 CSR 20-7.031(1)(F), streams in Missouri are classified as Class C, Class P, or P1 waters. Stream classification applies to specific reaches of a stream and not necessarily to the entire stream length. Classification of streams and the length of the classified segment can be found in Table H of 10 CSR 20-7.031. Streams not included in Table H are unclassified (Class U) and have no assigned designated uses."

Step 3: Determine stream water quality criteria:

"For unclassified streams, applicable water quality criteria must be met at the point of groundwater discharge to the stream."

Step 4: Determine 7Q10 and groundwater discharge:
"Unclassified streams have a default 7Q10 value of 0.0 cfs."

Step 7: Other considerations:
"In addition to specific water quality criteria, general water quality criteria must be met in waters of the state at all times, including mixing zones. General water quality criteria are discussed in 10 CSR 20-7.031(3).
In addition to meeting chronic water quality criteria at the downstream edge of the mixing zone, acute water quality criteria must be met as per the following:
For Class C and unclassified streams, the acute criteria must be met at the point of discharge,
For Class P and P1 streams, the acute criteria must be met at the edge of the zone of initial dilution and throughout the mixing zone, and
For an unclassified stream that flows into a classified stream or becomes a classified stream downstream of the point of discharge, the acute criteria must be met at the point of groundwater discharge to the unclassified stream."

Comments:
Also, why does an unclassified stream follow the most restrictive criteria, and at the point of groundwater discharge to the unclassified stream? Many unclassified streams are urban drainages and tributaries to larger, classified streams, which allow mixing and dilution. Urban streams are also potentially impacted by other upstream and anthropogenic contaminant sources. Unclassified urban streams are prevalent throughout the state. If a stream is unclassified due to it not having surface water flow for part of the year and, having no assigned designated uses, it should not have complete exposure pathways and not be subject to the most stringent water quality criteria at the point of discharge to the stream.

Also - what is the process to get unclassified streams classified?

Step 7 discusses "chronic criteria" and "acute criteria." It is unclear what these values are. Are they ecological or human health-based criteria?

Why, if an unclassified stream flows into a classified one, are the acute criteria required to be met at the point of groundwater discharge to the unclassified stream. (This is stated in Step 7, 3rd bullet)? This situation is similar to groundwater entering a classified stream, where the procedure outlined in this text is used to determine the acceptable contaminant concentration in the upstream source, except the classified stream allows mixing/dilution.

Response: An acute water quality criterion for the protection of aquatic life is the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1 hour) without harmful effects. Acute criteria apply to unclassified waters and to classified waters at the edge of the zone of initial dilution. A chronic water quality criterion for the protection of aquatic life is the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without harmful effects. Chronic criteria apply to classified waters only at the edge of the mixing zone. These terms will be added to the list of definitions.

Water quality criteria established for the protection of aquatic life from acute toxicity are in general higher than those established to protect against chronic toxicity. The acute criteria for a given COC should therefore not be the most restrictive criteria that can be applied. Where groundwater discharges to an unclassified stream, acute criteria apply at the point of discharge to protect against acute effects in the unclassified stream. In instances where acute criteria do not exist, the chronic criteria will be applied to the first downstream classified waterbody. For all waters of the state, the general criteria found in 10 CSR 20-7.031(3) applies.

Unclassified streams may become classified through water quality standards rulemaking following an affirmative result for a given beneficial use using waterbody classification guidelines found on the department's website (http://www.dnr.mo.gov/wpscd/wpcp/wqstandards/wq_standard_hm.htm).
(http://www.dnr.mo.gov/wpscd/wpcp/wqstandards/wq_standard_hm.htm).

Table E-1, Toxicity Values of Chemicals
Table E-2, Physical and Chemical Properties of Chemicals

Many chemical's toxicity values and physical and chemical properties are not included in the MRBCA guidance, including benzene, ethylbenzene, toluene, xylenes, methyl tertiary butyl ether (MTBE), benzo(a)pyrene and similar polyaromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), and arsenic. With the importance of those chemicals on final remedy selection and cleanup goals at many sites, it is important to have a review of all DTLs before they are promulgated as final.

Response: As noted in an earlier response, all of the chemicals of concern that are related to petroleum products and in the Tanks MRBCA are being addressed under a separate process by the Tanks Section. All information related to these chemicals in terms of chemical properties, toxicity values, and risk-based target levels is posted on the Tanks website and currently undergoing a review and comment process. These numerical values will be the same in both guidances.

Table E-4, Fate and Transport Parameters

Please provide a reference for the soil parameters selected for each soil type. Shouldn't dry bulk density and fraction organic carbon vary by soil type? There is little difference between silt and clay input parameters (only volumetric water content and volumetric air content). Shouldn't there be more of a difference in physical parameters between the soil types?

Response: These references are provided in the Missouri Risk-Based Corrective Action Process for Petroleum Storage Tanks, Soil Type Determination Guidelines, which, as stated earlier, will be added as an appendix to the Departmental MRBCA when it is final.